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Section 13

DISASTER AND EMERGENCY RESPONSE

This section mainly discusses flood and drought response. It also briefly considers other emergency situations.

13.1 INTRODUCTION

Many types of emergency situations are water-related, varying all the way from disastrous flooding to extreme drought. Most are natural occurrences, but a few (such as oil spills in waterways) are man-caused. When any emergency situation arises, a pre-arranged response plan, maintained by the Utah Division of Comprehensive Emergency Management (CEM), provides a quicker and more effective response. Generally, the response plan emphasizes prevention of an emergency and, therefore, prevention of damages. But when an emergency does occur, the immediate need is for optimum control, mitigation of damages, and then repair. The state maintains a hazard mitigation team to provide coordination with local governmental authority. This team represents state agencies in hazard mitigation matters. The following paragraphs attempt to define the organizational responsibilities for emergency response in the Bear River Basin, concentrating mainly floods and drought, the two most common water-related emergencies.

13.2 FLOOD PROBLEMS IN BASIN

Flooding has been a common occurrence in the basin for many years. Because the resulting damages have been moderate, flooding has not been a major local problem. In a 1989 study, the Corps of Engineers

estimated average annual damages from flooding, and analyzed structural control measures (see Ref. No. 1). Most of the damage from floods has been to agricultural land and property. Damages from thunderstorms are usually in the form of erosion and sediment deposition. Dry cropland areas in the Bear River Basin are most susceptible to this type of damage. Flooding along the river plains inundates cropland and pasture, damages irrigation systems, and disrupts rural road systems.

No single entity has sole authority for flood control management activities. Cities and counties have the necessary statutory authority to act, but at least six other organizations or officials also have some degree of authority and responsibility. Emergency response and hazard mitigation coordination authority rests with Utah CEM. Hazard mitigation planning is usually provided by the state hazard mitigation team following flood emergencies. Pre-emergency planning is also often conducted. Utah CEM maintains county preparedness plans.

Spring snowmelt flooding in the Bear River Basin periodically exceeds stream channel capacity, and overflows onto adjacent low lands. More serious damage occurs when heavy rain falls on frozen ground and/or a heavy snow pack. Severe flooding of this type has been experienced several times in Cache Valley.

Thunderstorms are common during the summer and fall months. These produce localized cloudburst flooding. The total volume of water produced by this type of storm is relatively small, although the instantaneous runoff rate is high. Damages from thunderstorms are usually in the form of erosion and sediment transport and deposition. Dry cropland areas in Box Elder County and Cache Valley are most susceptible to this type of damage.

Most of the Bear River flood plain has a high water table; thus, construction of homes and other buildings within this zone has been limited. Frequent flooding of these lands has also discouraged development, so they will probably remain agricultural. Floodplains subject to infrequent flooding have minor development presently, and are most likely to be developed in the future.



Flooding in Logan - SL Tribune

13.2.1 Bear River

The greatest opportunity in the basin at present to control the largest amount of potential annual flooding is at Bear Lake. UP&L's regulation of flows at Bear Lake has reduced the impact of flooding virtually every year on the mainstem of the Bear River below Bear Lake. Bear Lake is operated to provide an annual pre-runoff storage volume equal to twice the average annual runoff.

The reconnaissance study by the Corps of Engineers estimated damages on the Bear River between Oneida Narrows and Cutler Reservoir from historical floods. They are shown in Table 13-1. Due to the upstream regulation at Bear Lake, the flows and damages were less than natural runoff would have produced.

The following are brief descriptions of flood problems in some of the major tributaries of the Bear River.

13.2.2 Woodruff Creek

Flood damage has been primarily to diversion structures and pasture lands. Irrigation structures, farm roads, and fences have also been damaged. A few homes in Woodruff have been flooded.

13.2.3 Cub River

Flood damages have been principally to agricultural lands and irrigation facilities. Crops have been destroyed by long periods of inundation. Settlement pond embankments have been eroded. The flood problem along the last four miles of the river is related to its decreasing slope and its confluence with the Bear River.

TABLE 13-1
HISTORICAL FLOOD DAMAGES
ONEIDA NARROWS TO CUTLER RESERVOIR¹

Year of Flood	Peak	Damages	
	Flow (cfs) ^a	At Time of Flood	October 1990 Cost Index ^b
1952	3,999	\$ 164,000	\$ 806,000
1962	4,300	100,000	340,000
1971	3,960	175,000	441,000
1983	4,660	1,773,000	2,030,000

Note: 1986 was also high, with much of the runoff coming from Cache Valley tributaries. At the Bear River near Collinston gage, the peak was 12,700 cfs (Feb. 19, 1986).

^aFlow at Oneida Narrows Reservoir.

^bIndexed from October 1988 by a Factor of 1.062.

13.2.4 High Creek

Flood damages have consisted primarily of reduced crop yields. Irrigation facilities and rural roads have been eroded and blocked with sediment in some places.

13.2.5 Logan River

Floodwater has damaged campsites in Logan Canyon and homes within Logan City. Basements have been flooded and yards have been eroded. Downstream of the city, drainage and irrigation facilities have been damaged. County and farm roads have been overtopped. Railroad tracks have also been threatened.

13.2.6 Blacksmith Fork

Floodwater has affected the farming communities of Nibley and Millville. Several home basements have been flooded. County roads have been flooded and eroded, isolating some homes. Much of the agricultural damage resulted from extended inundation of farmlands, killing established crops. In some

years, flooding has prevented the planting of some crops. Fences and irrigation facilities have been damaged.

13.2.7 Little Bear River

Flood problems have been mainly a reduction in crop yields. Due to prolonged inundation of some fields, plants have been destroyed, requiring that fields be reseeded. Roads have been eroded and culverts plugged. Erosion has occurred on croplands upstream of Hyrum Reservoir. Serious damage has occurred in the past to a private fish hatchery near Paradise.

13.2.8 Malad River

Flood damages along the Malad River have been mainly to meadow, pasture, rural roads, and major county and state highway crossings. The Tremonton-Garland sewage treatment plant has been affected by floods.

13.2.9 Great Salt Lake (Bear River Bay)

The most notable flooding problem in recent years has been the high level of the Great Salt Lake, which damaged shoreline facilities around the entire lake. During the 1986 runoff season, the lake reached an elevation of almost 4212 feet, the highest in 140 years of recorded history. This shoreline flooding essentially inundated the Bear River Migratory Bird Refuge, and caused millions of dollars in damage to other private and public facilities in Box Elder County. Monetary damage at the refuge is estimated to be about \$4 million,⁶ about \$3 million at nine private duck clubs in Bear River Bay and the Harold Crane Waterfowl Management Area⁶, and about \$50,000⁵ for repair of wastewater treatment plants and other facilities.

13.3 FLOOD DAMAGE REDUCTION

In the Bear River Basin, the following structural and non-structural alternatives would help reduce losses from flooding.

13.3.1 Forecasting

In general, reservoirs in the basin, including Bear Lake, are operated on a forecast basis to maximize summer storage. A secondary objective is to minimize spilling. Although forecasting information is available and used in managing the reservoirs, perhaps some operational changes could further reduce downstream flooding.

13.3.2 Control Structures

Some opportunities exist to provide additional reservoirs or other control structures such as dikes or detention basins to reduce peak flows. Potential storage reservoirs could include flood control as a project function to reduce local flood damage along the Bear River and its tributaries. The Corps of Engineers has made flood evaluation studies of the potential Mill Creek, Avon, Honeyville,

and Oneida Narrows reservoir sites. Estimated annual potential flood reduction benefits for these reservoirs are \$31,000, \$122,000, \$224,000 and \$318,000 respectively, in 1988 dollars.

13.3.3 Stream Channel Capacity

Limited opportunity is available to restore stream channel capacity and thus reduce flooding. In a 1984 flood control study, the Corps of Engineers found that several improvements on a short stretch of the Logan River through Logan City were the only flood control measures that appeared to be eligible for assistance by the Corps at that time.

13.3.4 Upper Watershed Improvement

Rangeland and forestland conditions could be improved, thus reducing surface runoff, increasing infiltration, and retarding peak flows. The Soil Conservation Service has investigated a small watershed protection project under P.L. 566 for the Clarkston Creek watershed, but the project has not been funded. Measures for watershed improvement and flood protection in the Little Bear River drainage are proceeding under joint funding by USDA Hydrologic Unit Area and the non-point source pollution program.

13.3.5 Flood Plain Protection and Flood Insurance

Proper planning and regulation of future building construction would help prevent encroachment of inappropriate and expensive developments on the flood plains. Such action would not preclude other valuable uses of the floodplain, such as parks and golf courses.

As a protection against monetary losses when flood damage does occur, the National Flood Insurance Program is effective in areas where it is available. The Federal Emergency Management Agency (FEMA) has identified special flood hazard areas with flood insurance

rate maps for 23 communities and two counties in the basin. Zoning and flood hazard reduction regulations have been adopted by 20 of these communities to direct future construction to minimize flood damage. A key benefit from local adoption of the floodplain standards has been the availability of flood insurance.

13.4 FLOOD CONTROL RECOMMENDATIONS

The following recommendations deal with reducing the damages from floods in the Bear River Basin through studies, projects, management, and regulations.

13.4.1 Flood Studies

In any future studies of water supply development in the Bear River Basin, it is recommended that consideration be given to flood control as a project purpose. The Corps of Engineers' three-state reconnaissance study of the Bear River Basin¹ covers most phases of potential project development.

13.4.2 Small Watershed Projects

Prevention is usually more cost-effective than damage repair and mitigation. Flooding can be significantly reduced by maintaining and protecting watershed vegetation and/or by building watershed flood storage. The Soil Conservation Commission, in conjunction with the Soil Conservation Service and the local soil conservation districts, should continue their practice of re-evaluating the potential for small watershed projects in the Bear River Basin.

13.4.3 Management

A cooperative study should be undertaken by the Division of Water Resources, Bureau of Reclamation, and appropriate local water users, to determine the potential for further regulation of flood flows in Hyrum, Newton, and Porcupine reservoirs.

This recommendation is made while recognizing that the combined existing storage capacity of these three reservoirs is only 37,000 acre-feet, and the potential improvement in regulation is quite limited.

13.4.4 Flood Plain Zoning and Insurance

County and city governments should work through the state Community Assistance Program of the National Flood Insurance Program to evaluate flood hazard maps of identified flood plains, and enact appropriate zoning regulations to prevent further encroachment and thereby reduce the potential for flood damages. Most communities already have current maps and ordinances. In additional areas where national flood insurance can be made available by the adoption of the associated flood plain standards, these local governments should attempt to do so. Also, public education and promotion of flood awareness would be beneficial.

13.5 DROUGHT RESPONSE

In contrast to flooding, which tends to be more local in extent, drought is most often basinwide or statewide. Therefore, it has been dealt with in the past on a statewide basis. A drought response plan² has been prepared and is now in place to provide an effective means for the state of Utah to assess and respond to drought impacts. The plan came into being as a result of experience gained during the severe drought of 1976-1977. A drought in Bear River Basin would be dealt with as described below:

13.5.1 State Policy

The immediate and primary responsibility for drought relief rests with local authorities of city and county governments. State action is taken only when local capabilities cannot cope with existing or growing needs.

In the Bear River Basin, the most effective drought relief measures are probably the various actions taken by management organizations on a unilateral basis. Without such actions, water shortages would be much more severe. For example, UP&L's operation helps to alleviate drought by holdover storage in Bear Lake.

13.5.2 Drought Response Organization²

Although assisted by other groups, a Drought Response Committee (DRC) would represent the state in taking action and/or coordinating it. The DRC members are senior-level managers of the following state agencies or departments: Natural Resources, Environmental Quality, Agriculture, Community and Economic Development, and Office of Planning & Budget. The DRC is activated by a governor's proclamation. The governor also appoints the State Drought Coordinator, who serves as chairman of the DRC.

13.5.3 Drought Response Organization's Responsibilities

The primary responsibility for actions to conserve water and alleviate shortages would rest with the county and city governments of Box Elder, Cache, and Rich counties. When they determine that local capabilities can no longer cope with emerging needs and problems, the counties could request help from the state. Their request would be received through the State Drought Coordinator or the Governor. The DRC, in consultation with local authorities, would identify specific needs and coordinate available state resources to help. The Drought Review and Reporting Committee, activated earlier by the State Drought Coordinator, would have been aware of conditions in the Bear River Basin, and would have recommended activation of the DRC.

Task Forces for the responsibilities listed below would assist the DRC, as directed, by furnishing information and data on which to make decisions.

- Municipal water and sewer systems
- Agriculture
- Commerce and tourism
- Wildfire protection
- Wildlife
- Economic impacts

The Water Supply Availability Committee, constantly in existence, would have monitored the snowpack, precipitation, and streamflow in the previous months to be able to inform the State Drought Coordinator of the severity of the drought.

Through this response system, state resources would be made available to the local government authorities in the basin to assist them in coping with problems of the drought.

13.6 DROUGHT RESPONSE RECOMMENDATIONS

To prepare in advance for the difficult problems that must be solved in coping with a severe drought, each county and community should formulate its own drought response plan. To be effective, the plan must be workable, fair to all, and agreed on in advance. Eventually, most communities will face a severe drought situation. Advance preparation can reduce or minimize the turmoil and controversy which will otherwise occur.

13.7 OTHER EMERGENCY SITUATIONS

In addition to floods and droughts, other damaging situations may occur. Although much less common, they can occur quickly at any time, with little or no advance warning. Some examples that could be water-related include earthquakes, windstorms, snow- or earth-slides, dam failures or malfunction of spillway gates, contamination of drinking water

sources by oil or chemical spills, and interruption of water supplies by various causes.

Potential problems are too many to consider each one separately, but the general approach is similar. The local authorities have the first responsibility, and as outside help is needed, state and federal resources are available. For most of these unusual occurrences, the state's Division of Comprehensive Emergency Management is prepared to step in and give whatever assistance is needed, and would contact appropriate federal agencies as needed. The Division of Water Quality has responsibility where hazardous spills occur.

13.8 REFERENCES

In addition to the references listed below, attention is directed to Section 13 of the Utah State Water Plan, January 1990, which discusses the potential for damage to water resources and related facilities, and addresses eight policy issues regarding floodwater control and management, and disaster and drought response.

1. "Reconnaissance Report, Bear River Basin Investigation, Idaho-Utah-Wyoming," U.S. Corps of Engineers, Feb. 1989. Revised December 1989.

2. "Drought Response Plan," Utah Division of Water Resources and Drought Response Committee, March 1990.

3. "Floods," Bear River Basin Cooperative Study, U.S. Department of Agriculture, April 1977.

4. "Wasatch Front and Central Utah Flood Control Study, Utah, Volume 2, 1984 Update and Potential Multiple Purpose Projects, Lower Bear River Basin," U.S. Corps of Engineers, September 1984.

5. "Reconnaissance Report, Great Salt Lake," U.S. Corps of Engineers, December 1986.

6. Informal Damage Estimate by U.S. Fish and Wildlife Service and Utah Division of Wildlife Resources, Telephone Conversation in October 1990.